

Claims

[c1] 1. A controlled power transfer system in networks with sectors fed by two different batteries, applicable to automotive vehicles, with an architecture comprising at least a first battery B1 and a second battery B2 which can be charged from a generator G, both batteries B1, B2 being provided with a unit CB1, CB2 integrating at least one control module (10, 11) of the state of charge and state of health SOC, SOH of said batteries B1, B2 which feed respective networks (17, 18), a first one of them (17) integrating security and supervision or stand-by modules, and the second one (18) including at least one start up device, power being distributed to said networks (17, 18) from power distribution boxes SDN1, SDN2, SDN3 which include a management microcontroller (1, 2, 3), and the system integrating a communications bus (19), characterized by also comprising a detection device (30) of a voltage and/or polarity level of an external supply susceptible to being connected on at least one of the posts of one of said batteries B1 and B2, and controlled switching devices (33, 34) for routing said external power flow to a predetermined one of said two batteries B1 or B2, and in that said power distribution boxes

SDN1, SDN2, SDN3 to the loads are interconnected and connected to said control units CB1, CB2 of batteries B1, B2, for carrying out permanent monitoring of the state of health and state of charge of said two batteries B1, B2 and providing controlled power transfer between the two batteries B1, B2, at any time, even in a situation when the vehicle engine start up key is off, regardless of consumption required by the loads and in prevention of future demands.

- [c2] 2. A system according to claim 1, characterized in that said switching devices (33, 34) are controlled by a microprocessor (32) receiving as input the voltage or polarity level in an auxiliary post (30a) intended for connection of said external power source.
- [c3] 3. A system according to claim 1, characterized in that said two batteries B1, B2 have differentiated voltage levels and in that each one of said power distribution boxes SDN1, SDN2 and SDN3 includes a converter (25, 26, 27), at least one (25) of said converters being two-way and permitting said power transfer between said batteries B1, B2 in either direction, according to the result of said monitoring of the state thereof.
- [c4] 4. A system according to claim 1, characterized in that it comprises three of said power distribution boxes SDN1,

SDN2, and SDN3, a first of them SDN1 foreseen for feeding loads in the front area of the vehicle, a second one SDN2 intended for supplying a central area thereof, and a third one SDN3 applied for supplying power to a rear part of the vehicle.

- [c5] 5. A system according to claim 1, characterized in that it comprises three of said power distribution boxes SDN1, SDN2 and SDN3, a first of them SDN1 for feeding loads in the front area of the vehicle, a second one SDN2 intended for supplying a central area thereof, and a third one SDN3 foreseen for supplying power to a rear part of the vehicle, and in that the first of said boxes SDN1 is fed by battery B1 at a lower voltage level and includes said two-way converter (25) permitting feeding loads at said first voltage level and at a second, higher voltage level, the two remaining power distribution boxes SDN2 and SDN3 being connected to battery B2, at a higher voltage level, and each one of them integrating a one-way converter (26, 27) enabling power supply at said first lower voltage level.
- [c6] 6. A system according to claim 3, characterized in that said control unit CB1, CB2 associated to each one of the batteries B1, B2 comprises a power disconnection or BCO (Battery Cut Off) device (13, 14) applied to the automatic disconnection of the battery B1, B2 from its network, in

the case of an accident or due to instructions received from one of the microcontrollers of the distribution boxes SDN1, SDN2, SDN3 or from the control unit CB1, CB2.

- [c7] 7. A system according to claim 6, characterized by integrating a user-accessible switch 13a, 14a for enabling or disabling said disconnection BCO devices (13, 14).
- [c8] 8. A power transfer control method in networks with sectors fed by two different batteries, applicable to automotive vehicles, with an architecture comprising at least a first battery B1 and a second battery B2 which can be charged from a generator G, both batteries B1, B2 being provided with a unit CB1, CB2 integrating at least one control module (10, 11) of the state of charge and state of health SOC, SOH of said batteries B1, B2 which feed respective networks (17, 18), a first one of them (17) integrating security and supervision or stand-by modules, and the second one (18) including at least one start up device, power being distributed to said networks (17, 18) from power distribution boxes SDN1, SDN2, SDN3 which include a management microcontroller (1, 2, 3), and the system integrating a communications bus (19), characterized by carrying out permanent monitoring of the state of health (SOH) and state of charge (SOC) of each one of said two batteries B1, B2 and of the voltage or

polarity of the external supply susceptible to being connected to one of the posts of one of said batteries B1, B2, and by carrying out an actuation by means of microcontrollers for ensuring a power transfer between said two batteries B1, B2, at any time.

- [c9] 9. A method according to claim 7, characterized in that said two batteries B1, B2 have differentiated voltage levels, and in that each one of said power distribution boxes SDN1, SDN2, SDN3 includes a DC/DC converter (25, 26, 27), at least one (25) of said converters being two-way and carrying out said power transfer between said batteries B1, B2 through said converter, in either direction, according to the result of said monitoring of the state thereof.
- [c10] 10. A method according to claim 8, characterized in that said control unit CB1, CB2 associated to each one of the batteries B1, B2 comprises a power disconnection or BCO (Battery Cut Off) device (13, 14) applied to the automatic disconnection of the battery B1, B2 from its network (17, 18) in case of an accident or due to instructions received from one of the microcontrollers of the distribution boxes SDN1, SDN2, SDN3 or from the control unit CB1, CB2, and in that said disconnection BCO devices (13, 14) are susceptible to manually enabling or disabling by means of a user-accessible switch (13a, 14a).

- [c11] 11. A method according to claim 10, characterized in that in the case of supplying battery B2 at a higher voltage level from battery B1, at a lower voltage level, it will be checked that the SOC/SOH of the 12 V battery B1 is correct, and the discharge cycles of said battery B1 will likewise be controlled.
- [c12] 12. A method according to claim 11, characterized in that in order to ensure the efficacy of charging battery B2 at a higher voltage level, it is also ensured that battery B1 at a lower voltage level does not supply power to the unnecessary loads, disconnecting for such purposes said loads through the corresponding disconnection BCO device (13).
- [c13] 13. A method according to claim 9, characterized in that said disconnection BCO device (13, 14) disconnects the batteries B1, B2 from the networks which they are supplying, conserving the connection between said two batteries B1, B2, except in the case of actuation of the BCO device (13, 14) due to an accident.
- [c14] 14. A system according to claim 3, characterized in that it comprises three of said power distribution boxes SDN1, SDN2, and SDN3, a first of them SDN1 foreseen for feeding loads in the front area of the vehicle, a sec-

ond one SDN2 intended for supplying a central area thereof, and a third one SDN3 applied for supplying power to a rear part of the vehicle.

[c15] 15. A system according to claim 3, characterized in that it comprises three of said power distribution boxes SDN1, SDN2 and SDN3, a first of them SDN1 for feeding loads in the front area of the vehicle, a second one SDN2 intended for supplying a central area thereof, and a third one SDN3 foreseen for supplying power to a rear part of the vehicle, and in that the first of said boxes SDN1 is fed by battery B1 at a lower voltage level and includes said two-way converter (25) permitting feeding loads at said first voltage level and at a second, higher voltage level, the two remaining power distribution boxes SDN2 and SDN3 being connected to battery B2, at a higher voltage level, and each one of them integrating a one-way converter (26, 27) enabling power supply at said first lower voltage level.